

VEHICLE STORAGE BOX WITH SINGLE HINGED DOUBLE SECURED
COMPARTMENTS AND DUAL ACTUATING CAM LATCHES

TO THE COMMISSIONER OF PATENTS AND TRADEMARKS:

Your petitioner, Dale S. Cheney, a citizen of the United States and resident of Utah, whose post office address is 2679 West 1700 South, Syracuse Utah 84075, pray that letters patent may be granted to him as an inventor of the improvement in a **VEHICLE STORAGE BOX WITH SINGLE HINGED DOUBLE SECURED COMPARTMENTS AND DUAL ACTUATING CAM LATCHES** as set forth in the following specification.

5
10
15
20

Field of the Invention

The present invention relates to utility vehicle storage boxes. Specifically, the storage box has single hinged double secured compartments, a dual actuating cam latching design, which catches when the lid is open.

5

Background of the Invention

There is an overstated need in the industry to provide container and box arrangements to store and hold articles in a pickup truck bed. For example, U.S. Patent Nos. 4,531,774 to Whatley; 4,936,624 to West; and 4,967,944 to Waters, which are incorporated by reference for their supportive teachings, show just a few of the proposed schemes for pickup truck mounted boxes and associated mounting structures. U.S. Patent No. 5, 484, 092, to Cheney, is also incorporated by reference.

15
20

The theft of valuable articles from vehicles is an ever increasing reality of modern life. Thieves are particularly attracted to certain types of valuable articles. For example, many persons desire to keep sporting good articles, such as rifles, shotguns, and fishing rods, in a vehicle at all times to be ready for immediate use. Such sporting goods are particularly attractive targets for thieves and, due to their elongated size, cannot be effectively hidden (for example by covering with clothing), in a vehicle which does not have a securable trunk space.

5 The need for providing secure storage in a pickup truck, or other vehicle without a trunk space, is recognized in the art. Even further, U.S. Pat No. 4,809,897 to Wright, also incorporated by reference for its illustrative teachings, provides a lockable storage compartment for use in a vehicle cab; thus recognizing the need for secure storage even inside a locked vehicle compartment.

10 There are, however, many disadvantages associated with the prior art designs. Disadvantageously, the Wright reference is unusable for storage of elongated, generally flat sporting goods such as rifles and fishing gear. Also, the device disclosed in the Wright reference does not effectively protect articles from damage due to impacts and provides inadequate protection from the weather if it were ever mounted exterior of the vehicle cab.

15 Additionally, the previously available storage devices provide inadequate security from theft, do not sufficiently protect valuable articles from damage, and/or are inconvenient to use.

20 Still another disadvantage of conventional vehicle storage boxes lies with the closing and securing of the lid to the main base compartment. To close the lid and secure it, the user must exert all the necessary force needed to lower the lid into its proper position for locking. This can be burdensome when items in the box offer any resistance because the box is too full. There is nothing in the design of conventional boxes to facilitate the closing and securing of the lid to the base compartment when the box is too full.

In view of the forgoing, it would be an advance in the art to provide a vehicle mounted storage box with a secured compartment for holding and protecting valuable sporting goods and other such articles from theft and damage and which is convenient to use. It would also be an advance in the art to provide a vehicle storage box that could be completely opened from either side of the vehicle. It would be yet another advancement in the art to provide a vehicle storage box that facilitates closing and locking of an overfilled box, thus alleviating the need for the user to exert all necessary force needed for closing and securing the lid.

Summary of the Invention

It is a principle advantage of the present invention to provide a vehicle storage box which has single hinged double secured compartments, and has a dual actuating cam latching design, which catches when the lid is still open.

It is another advantage of the present invention to provide a vehicle storage box which facilitates closing and locking of an overfilled box, thus alleviating the need for the user to exert all necessary force needed for closing and securing the lid.

Still another advantage of the present invention is to provide a vehicle storage box which has a base structure, a lid, a divider means, a divider coupling means, and a lid coupling means.

Yet another advantage of the present invention is to provide a vehicle storage box which has a single hinge connecting a base structure, a divider means, and a lid, such that the lid and the divider means pivot around the same axis.

The vehicle storage box of the present invention comprises: a) a base structure; b) a lid, pivotally connected to the base structure, shaped to enclose the base structure; c) divider means, pivotally connected to the base structure, for dividing the storage box into two compartments for holding articles; d) divider coupling means, connected to the divider means and the lid, for releasably coupling the divider means to the lid; and e) lid coupling means, connected to the lid and the base structure, for releasably coupling the lid to the base structure, and having a first coupling position when the lid is in an opened position.

The lid coupling means comprises a lid latch coupled to the lid, and lid actuator means, rotatably coupled to the base structure, for engaging and latching the lid latch while in the first coupling, opened position.

The lid coupling means also comprises a first and second lid actuator and a first and second lid latch wherein the first and second lid actuators are coupled together by a lid actuator connector for simultaneous operation of the first and second lid actuators.

The divider coupling means comprises a first and second divider actuator coupled to the lid and a first and second divider latch coupled to the divider means wherein the first and second divider actuators are coupled together by a divider

10
11
12
13
14
15
16
17
18
19
20

actuator connector for simultaneous operation of the first and second divider actuators.

The vehicle storage box according to the present invention also includes a single hinge connecting the base structure, the divider means and the lid, such that the lid and the divider means pivot around the same axis.

5 Additional advantages of the present invention will be apparent from the following detailed description of preferred embodiments thereof, which proceeds with reference to the accompanying drawings.

Brief Description of the Drawings

10 These and other features and advantages of the present invention will be better understood by reading the following detailed description, taken together with the drawings, wherein:

15 Figure 1 is an isometric view of one embodiment illustrated in Figure 1.

Figure 2 is a front view of a lid actuator means illustrated in Figure 1.

Figure 3 is a side view of a lid actuator means illustrated in Figure 1.

Figure 4 is a front view of a lid latching means or latch illustrated in Figure 1.

20 Figure 5 is a side view, taken along lines 5-5 of Figure 4, of a lid latching means of the latch illustrated in Figure 1.

Figure 6 depicts the anticipated engagement and relative position of a lid actuator means and a lid latching means or latch illustrated in Figure 1.

Figure 7 depicts the initial point of contact or engagement and relative position of a lid actuator means and a lid latching means or latch illustrated in Figure 1.

Figure 8 depicts an interim point of travel and relative position of a lid actuator means and a lid latching means or latch illustrated in Figure 1.

Figure 9 depicts the final, locked, and relative position of a lid actuator means and a lid latching means or latch illustrated in Figure 1.

Figure 10 is a front view of a divider actuator means illustrated in Figure 1.

Figure 11 is a front view of a vehicle storage box having single hinged dual compartments illustrated in Figure 1.

Figure 12 is a side view of a vehicle storage box having single hinged dual compartments illustrated in Figure 1.

It is noted that the drawings of the invention are not to scale. The drawings are merely schematic representations, not intended to portray specific parameters of the invention. The drawings are intended to depict only typical embodiments of the invention, and therefore should not be considered as limiting the scope of the invention. The invention will be described with additional specificity and detail through the use of the accompanying drawings. Like numbering between figures represent like elements.

15

20

Detailed Description of the Preferred Embodiment

In the preferred embodiment shown in Fig. 1, a vehicle storage box 10, according to the present invention, comprises a base structure 12 having a compartment for holding various articles, a lid 14, a divider or divider means 16, a lid coupler or lid coupling means 23, and a divider coupler or divider coupling means 27. Lid 14 and divider 16 are pivotally coupled to the base structure 12 by hinge 34. Thus, lid 14 and divider 16 rotate or pivot about the same axis. In a preferred embodiment hinge 34 is a conventional piano hinge. Hinge 34 will be described in more detail below.

Two compartments exist according to a preferred embodiment of the present invention. The first, or base compartment 20 is defined by the base structure 12 and the bottom surface of divider 16. The second, or top compartment 18 is defined by the bottom surface of lid 14 and the top surface of divider 16.

In addition to the teachings disclosed in U.S. Patent No. 5,484,092, which is herein incorporated by reference, vehicle storage box 10 has a lid coupler 23 engaging lid 14 while lid 14 is still in an opened position. Lid coupler 23 further has a lid latch or lid latching means 24 and a lid actuator or lid actuating means 22. Additionally, divider coupler 27 is comprised of a divider actuator or divider actuator means 28 and a divider latch or divider latching means 26.

Uniquely, lid coupler 23 has a first and second lid actuator 22. Divider coupler 27 has a first and second divider actuator or divider actuating means 28.

First and second lid actuators 22 are connected by a lid actuator connector 30. First and second divider actuators 28 are connected by a divider actuator connector 32. These connectors 32 allow the user of vehicle storage box 10 to open and operate simultaneously, or in a dual manner, first and second lid coupler 23 or divider coupler 27 from one side of vehicle storage box 10. By activating either first or second lid actuator 22 or divider actuator 28, the other is simultaneously activated via connector 32 coupling them together.

Referring to Figs. 2 and 3, lid actuator 22, has a hooking cam 45 having a hook 46 and a cam 47. Hooking cam 45 is attached to and rotates about bolt 36, which also serves as a coupling member for stabilizing means 43 and pulley 40. Bolt 36 attaches lid actuator 22 to base structure 12, and couples handle 31 to base structure 12. Lid actuator 22 also comprises a lid actuator connector 35, which includes a pulley 40 and a cable 30. Cable 30 connects a lid actuator 22 between a first and second lid actuator 22 for providing simultaneous operation. This allows a user to simultaneously activate both locking mechanisms of the present invention from either side of the vehicle storage box 10. As a user turns handle 31 on one side of vehicle storage box 10, pulley 40 rotates. As either pulley 40 rotates, this causes the other pulley 40 to rotate simultaneously because of cable 30 connected there between. This simultaneous rotation causes the activation of hooking cam 45 located on each of first and second lid actuators 22. Stabilizing means 43 has an eyelet screw 42 and bracket 44. Bracket 44 is attached to base structure 12 and

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

20

acts as a brace for eyelet screw 42. As appreciated by one skilled in the art, stabilizing means 43 may consist of many different arrangements for supporting lid actuator means 22 and is not necessarily limited to bracket 44 and eyelet screw 42.

This provides a significant advantage over prior art vehicle storage boxes.

5 Typically, to secure and lock a vehicle storage box with a locking mechanism on each side of the box, the user had to activate each mechanism one at a time because each is independent of the other. This would require the user to activate one lock and then walk around to the other side of the vehicle to activate the other lock. The present invention eliminates this hassle by connecting each of its two coupling means 23 and 27 together.

10 Lid actuator 22 is constructed to rotate substantially 180 degrees about bolt 36. The need to rotate substantially 180 degrees is a function of hooking cam 45. To enable the user to hook lid latch 24 while lid 14 is still in an opened position, and to then rotate lid actuator 22 to its final position wherein lid latch 24 completely tracks withing cam 47 pulling lid 14 to a closed and secured position, lid actuator must rotate substantially 180 degrees. The range of motion hooking can travels from the first coupling position to the final coupling position is substantially 180 degrees. This allows the relationship between lid actuator and hooking cam 45 to function as intended.

15 Pulley 40 further includes a cable set screw 33 coupled to pulley 40 and engaging cable 30. Cable set screw 33 allows cable 30 to be adjusted and secured

in a fixed orientation. Through use, lid actuator 22 may from time to time need adjustment to ensure proper orientation of hooking cam 45. By loosening cable set screw 33, cable 30 can be adjusted so that lid actuator 22 is properly oriented ready to accept and engage lid latch 24.

Fig. 4 and Fig. 5, taken along lines 5-5 of Fig. 4, show a preferred embodiment of lid latch 24 according to the present invention. Lid latch 24 adjustably attaches to lid 14 as shown. Lid latch 24 is a unique feature of the present invention because of its ability to engage lid actuator 22 and to facilitate closing and securing of lid 14 to base structure 12. Arm 50, which consists essentially of two substantially L-shaped bars, is pivotally connected by a bolt 62 at one end of arm 50 to bracket 52, which is attached to the inside of lid 14. To enable arm 50 to always be in a proper position to engage hook 46, a spring 54 is attached to arm 50 and bracket 52. Spring 54 is tensioned such that it pulls arm 50 in a pivoting direction causing it to rest against a stopper 58. Stopper 58 is coupled to bracket 52, but is slidably coupled in a slotted aperture 57 wherein stopper 58 may be adjusted. Adjusting stopper 58 subsequently adjusts the biased position of arm 50 as it is pulled by spring 54. By doing so, arm 50 is always in the same position ready to be engaged with hook 46. One end of spring 54 attaches to arm 50 via a lower spring support 60 attached to arm 50 a substantial distance away from the pivot point, bolt 62, of arm 50 such that a moment is created about the pivot point of arm 50 causing arm 50 to rotate or pivot until stopped by stopper 50. The other

5
10
15
20

20

end of spring 54 attaches to an upper spring support 56 which is attached to bracket 52. Spring 54 ensures proper orientation of arm 50 for engaging hook 46 of lid actuator 22. It will be appreciated by one skilled in the art that several embodiments exist which could perform the identical function as the preferred embodiment of the lid latch 24 described herein. For example, arm 50 could be a curved member or a straight member. The critical feature of arm 50 is that it latches lid actuator 22 and is allowed to pivot as it tracks along cam 47.

Figs. 6-9 show the operation interaction and the relative positions of the lid latch 24 with respect to the lid actuator 22 as the lid actuator 22 is rotated through its several positions. In connection with lid actuator 22, latching member 64 of lid latch 24 engages hook 46 of hooking cam 45. As lid actuator 22 is rotated, latching member 64 on arm 50 of lid latch 24 tracks along cam 47, thus pulling lid 14 down. Upon full or complete rotation of lid actuator 22, lid 14 comes to rest within notch 49. Notch 49 is integrally formed within cam 47 and serves to receive and secure latching member 64 when lid 14 is in a closed and locked position. Notch 49 prevents lid 14 from inadvertently opening when subjected to vibration or bouncing. This is significant because, under varying driving conditions, lid 14 may have a tendency to open. Notch 49 prevents this and ensures lid 14 stays in its secured and locked position.

20 In conventional vehicle storage box's, the user must hold down lid 14 in its completely closed position while operating the locking mechanism used to secure

lid 14 to the main base structure 12. The present invention eliminates this problem by providing a storage box 10 that has a lid coupler 23 that can be operated when lid 14 is in a partially opened position. The user need not hold down lid 14 completely to activate the locking mechanism.

5 Fig. 6 shows a preferred embodiment of lid coupler 23 just prior to engagement. As lid 14 is lowered, arm 50 comes within the region where hooking cam 45 on lid actuator 22 is able to engage latching member 64 upon rotation of lid actuator 22. Distance 70 represents the distance between latching member 64 and the axis of rotation 36 of hooking cam 45.

10 Fig. 7 shows the lid coupler 23 at the initial or first coupling position. Lid 14 is lowered and hooking cam 45 is slightly rotated about axis 36 such that hook 46 is able to engage and hook latching member 64. This represents the first coupling position of lid coupler 23. Upon hooking latching member 64, latching member 64 is instantly placed within the cam 47. At this first coupling position, the user is no longer required to hold lid 14 down. The lid coupler 23 allows the user, if desired, to bring lid 14 to the first coupling position as described above and then let go of lid 14. Lid 14 is now held down by lid coupler 23, ready to be closed without further assistance of the user. To close the lid, lid actuator 22 is rotated completely, which will cause latching member 64 to track along cam 47 and pull lid 14 down until latching member comes to rest in notch 49. At this point, lid 14 is in its secured and

15
20

locked position. Distance 72 represents the distance between latching member 64 and the axis of rotation 36 at the first coupled position.

Fig. 8 shows lid coupler 23 at a coupled position half-way through full rotation. Latching member 64 has tracked a distance along cam 47. Also, lid 14 has been pulled down a distance equal to the distance 72 in Fig. 7. Distance 74 represents that there is substantially no distance between latching member 64 and the axis of rotation 36 half-way through rotation. Lid 14 is pulled down and travels a distance 72 by rotating lid actuator 22 about halfway around.

Fig. 9 represents lid coupler 23 at a fully rotated coupled position. This position represents lid 14 in its fully closed and secured position to base structure 12. As shown by Fig. 9, latching member 64 has completely tracked cam 47 and is resting within notch 49. Arm 50 has slightly rotated about axis 62 as latching member 64 has tracked cam 47. Distance 76 represents the distance between latching member 64 and the axis of rotation 36 for the last portion of rotating lid actuator's 22 rotation. Distance 77 represents the distance traveled by latch member 64 after it has traversed center line 79. As shown by these several figures, lid 14 travels a combined distance equal to distance 72, plus distance 76, minus distance 77, as lid actuator 22 is rotated from a first coupling position to a final coupling position where lid 14 is closed and secured to base structure 12. Because of the cam action of cam 47, as lid actuator 22 is rotated, lid 14 travels the farthest between the first coupling position and the half-way point of rotation illustrated in

Fig. 8. From the half-way point of rotation to the final complete point of rotation of lid actuator 22, lid 14 travels a lesser relative distance. As appreciated by one skilled in the art, a combination of the forces between lid actuator 22, lid latch 24, and the cam action of cam 47, a rollover effect is achieved as lid actuator 22 is rotated from the half-way point to the point of complete rotation when lid actuator is resting within notch 49. As latching member 64 is tracking along cam 47 during the final positions of rotation, latching member 64 rolls over into a resting position within notch 49 once latching member 64 crosses or traverses center line 79. This rollover effect facilitates a secure fit of lid 14 to base structure 12 and aids in the closing of lid 14. Also, throughout complete rotation of lid actuator 22, pivot points, 36 and 62 are always in-line. Thus, eliminating any detrimental moment force between the two pivot points 36 and 62.

Referring now to Fig. 10, divider coupler 27 comprises a divider actuator 28 and a divider latch 26. In a preferred embodiment, divider actuator 28 comprises a latching member 80 pivotally coupled to lid 14 at pivot point 90. Latching member 80 couples or latches to divider latch 26 shown in Fig. 1. Coupling divider latch 26 to latching member 80, divider 16 is secured to lid 14. Divider 16, when secured to lid 14, forms a second compartment of vehicle storage box 10.

Divider actuator 28 also functions similarly to lid actuator 22 in that operation of one simultaneously controls operation of the other. In a preferred embodiment, a first and second divider coupler 27 includes a first and second divider actuator 28

15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
259
260
261
262
263
264
265
266
267
268
269
269
270
271
272
273
274
275
276
277
278
279
279
280
281
282
283
284
285
286
287
288
289
289
290
291
292
293
294
295
296
297
298
299
299
300
301
302
303
304
305
306
307
308
309
309
310
311
312
313
314
315
316
317
318
319
319
320
321
322
323
324
325
326
327
328
329
329
330
331
332
333
334
335
336
337
338
339
339
340
341
342
343
344
345
346
347
348
349
349
350
351
352
353
354
355
356
357
358
359
359
360
361
362
363
364
365
366
367
368
369
369
370
371
372
373
374
375
376
377
378
379
379
380
381
382
383
384
385
386
387
388
389
389
390
391
392
393
394
395
396
397
398
399
399
400
401
402
403
404
405
406
407
408
409
409
410
411
412
413
414
415
416
417
418
419
419
420
421
422
423
424
425
426
427
428
429
429
430
431
432
433
434
435
436
437
438
439
439
440
441
442
443
444
445
446
447
448
449
449
450
451
452
453
454
455
456
457
458
459
459
460
461
462
463
464
465
466
467
468
469
469
470
471
472
473
474
475
476
477
478
479
479
480
481
482
483
484
485
486
487
488
489
489
490
491
492
493
494
495
496
497
498
499
499
500
501
502
503
504
505
506
507
508
509
509
510
511
512
513
514
515
516
517
518
519
519
520
521
522
523
524
525
526
527
528
529
529
530
531
532
533
534
535
536
537
538
539
539
540
541
542
543
544
545
546
547
548
549
549
550
551
552
553
554
555
556
557
558
559
559
560
561
562
563
564
565
566
567
568
569
569
570
571
572
573
574
575
576
577
578
579
579
580
581
582
583
584
585
586
587
588
589
589
590
591
592
593
594
595
596
597
598
599
599
600
601
602
603
604
605
606
607
608
609
609
610
611
612
613
614
615
616
617
618
619
619
620
621
622
623
624
625
626
627
628
629
629
630
631
632
633
634
635
636
637
638
639
639
640
641
642
643
644
645
646
647
648
649
649
650
651
652
653
654
655
656
657
658
659
659
660
661
662
663
664
665
666
667
668
669
669
670
671
672
673
674
675
676
677
678
679
679
680
681
682
683
684
685
686
687
688
689
689
690
691
692
693
694
695
696
697
698
698
699
699
700
701
702
703
704
705
706
707
708
709
709
710
711
712
713
714
715
716
717
718
719
719
720
721
722
723
724
725
726
727
728
729
729
730
731
732
733
734
735
736
737
738
739
739
740
741
742
743
744
745
746
747
748
749
749
750
751
752
753
754
755
756
757
758
759
759
760
761
762
763
764
765
766
767
768
769
769
770
771
772
773
774
775
776
777
778
779
779
780
781
782
783
784
785
786
787
788
789
789
790
791
792
793
794
795
796
797
798
798
799
799
800
801
802
803
804
805
806
807
808
809
809
810
811
812
813
814
815
816
817
818
819
819
820
821
822
823
824
825
826
827
828
829
829
830
831
832
833
834
835
836
837
838
839
839
840
841
842
843
844
845
846
847
848
849
849
850
851
852
853
854
855
856
857
858
859
859
860
861
862
863
864
865
866
867
868
869
869
870
871
872
873
874
875
876
877
878
879
879
880
881
882
883
884
885
886
887
888
889
889
890
891
892
893
894
895
896
897
898
898
899
899
900
901
902
903
904
905
906
907
908
909
909
910
911
912
913
914
915
916
917
918
919
919
920
921
922
923
924
925
926
927
928
929
929
930
931
932
933
934
935
936
937
938
939
939
940
941
942
943
944
945
946
947
948
949
949
950
951
952
953
954
955
956
957
958
959
959
960
961
962
963
964
965
966
967
968
969
969
970
971
972
973
974
975
976
977
978
979
979
980
981
982
983
984
985
986
987
988
989
989
990
991
992
993
994
995
996
997
997
998
999
999
1000
1001
1002
1003
1004
1005
1006
1007
1008
1009
1009
1010
1011
1012
1013
1014
1015
1016
1017
1018
1019
1019
1020
1021
1022
1023
1024
1025
1026
1027
1028
1029
1029
1030
1031
1032
1033
1034
1035
1036
1037
1038
1039
1039
1040
1041
1042
1043
1044
1045
1046
1047
1048
1049
1049
1050
1051
1052
1053
1054
1055
1056
1057
1058
1059
1059
1060
1061
1062
1063
1064
1065
1066
1067
1068
1069
1069
1070
1071
1072
1073
1074
1075
1076
1077
1078
1079
1079
1080
1081
1082
1083
1084
1085
1086
1087
1088
1089
1089
1090
1091
1092
1093
1094
1095
1096
1097
1097
1098
1099
1099
1100
1101
1102
1103
1104
1105
1106
1107
1108
1109
1109
1110
1111
1112
1113
1114
1115
1116
1117
1118
1119
1119
1120
1121
1122
1123
1124
1125
1126
1127
1128
1129
1129
1130
1131
1132
1133
1134
1135
1136
1137
1138
1139
1139
1140
1141
1142
1143
1144
1145
1146
1147
1148
1149
1149
1150
1151
1152
1153
1154
1155
1156
1157
1158
1159
1159
1160
1161
1162
1163
1164
1165
1166
1167
1168
1169
1169
1170
1171
1172
1173
1174
1175
1176
1177
1178
1179
1179
1180
1181
1182
1183
1184
1185
1186
1187
1188
1189
1189
1190
1191
1192
1193
1194
1195
1196
1197
1197
1198
1199
1199
1200
1201
1202
1203
1204
1205
1206
1207
1208
1209
1209
1210
1211
1212
1213
1214
1215
1216
1217
1218
1219
1219
1220
1221
1222
1223
1224
1225
1226
1227
1228
1229
1229
1230
1231
1232
1233
1234
1235
1236
1237
1238
1239
1239
1240
1241
1242
1243
1244
1245
1246
1247
1248
1249
1249
1250
1251
1252
1253
1254
1255
1256
1257
1258
1259
1259
1260
1261
1262
1263
1264
1265
1266
1267
1268
1269
1269
1270
1271
1272
1273
1274
1275
1276
1277
1278
1279
1279
1280
1281
1282
1283
1284
1285
1286
1287
1288
1289
1289
1290
1291
1292
1293
1294
1295
1296
1297
1297
1298
1299
1299
1300
1301
1302
1303
1304
1305
1306
1307
1308
1309
1309
1310
1311
1312
1313
1314
1315
1316
1317
1318
1319
1319
1320
1321
1322
1323
1324
1325
1326
1327
1328
1329
1329
1330
1331
1332
1333
1334
1335
1336
1337
1338
1339
1339
1340
1341
1342
1343
1344
1345
1346
1347
1348
1349
1349
1350
1351
1352
1353
1354
1355
1356
1357
1358
1359
1359
1360
1361
1362
1363
1364
1365
1366
1367
1368
1369
1369
1370
1371
1372
1373
1374
1375
1376
1377
1378
1379
1379
1380
1381
1382
1383
1384
1385
1386
1387
1388
1389
1389
1390
1391
1392
1393
1394
1395
1396
1397
1397
1398
1399
1399
1400
1401
1402
1403
1404
1405
1406
1407
1408
1409
1409
1410
1411
1412
1413
1414
1415
1416
1417
1418
1419
1419
1420
1421
1422
1423
1424
1425
1426
1427
1428
1429
1429
1430
1431
1432
1433
1434
1435
1436
1437
1438
1439
1439
1440
1441
1442
1443
1444
1445
1446
1447
1448
1449
1449
1450
1451
1452
1453
1454
1455
1456
1457
1458
1459
1459
1460
1461
1462
1463
1464
1465
1466
1467
1468
1469
1469
1470
1471
1472
1473
1474
1475
1476
1477
1478
1479
1479
1480
1481
1482
1483
1484
1485
1486
1487
1488
1489
1489
1490
1491
1492
1493
1494
1495
1496
1497
1497
1498
1499
1499
1500
1501
1502
1503
1504
1505
1506
1507
1508
1509
1509
1510
1511
1512
1513
1514
1515
1516
1517
1518
1519
1519
1520
1521
1522
1523
1524
1525
1526
1527
1528
1529
1529
1530
1531
1532
1533
1534
1535
1536
1537
1538
1539
1539
1540
1541
1542
1543
1544
1545
1546
1547
1548
1549
1549
1550
1551
1552
1553
1554
1555
1556
1557
1558
1559
1559
1560
1561
1562
1563
1564
1565
1566
1567
1568
1569
1569
1570
1571
1572
1573
1574
1575
1576
1577
1578
1579
1579
1580
1581
1582
1583
1584
1585
1586
1587
1588
1589
1589
1590
1591
1592
1593
1594
1595
1596
1597
1597
1598
1599
1599
1600
1601
1602
1603
1604
1605
1606
1607
1608
1609
1609
1610
1611
1612
1613
1614
1615
1616
1617
1618
1619
1619
1620
1621
1622
1623
1624
1625
1626
1627
1628
1629
1629
1630
1631
1632
1633
1634
1635
1636
1637
1638
1639
1639
1640
1641
1642
1643
1644
1645
1646
1647
1648
1649
1649
1650
1651
1652
1653
1654
1655
1656
1657
1658
1659
1659
1660
1661
1662
1663
1664
1665
1666
1667
1668
1669
1669
1670
1671
1672
1673
1674
1675
1676
1677
1678
1679
1679
1680
1681
1682
1683
1684
1685
1686
1687
1688
1689
1689
1690
1691
1692
1693
1694
1695
1696
1697
1697
1698
1699
1699
1700
1701
1702
1703
1704
1705
1706
1707
1708
1709
1709
1710
1711
1712
1713
1714
1715
1716
1717
1718
1719
1719
1720
1721
1722
1723
1724
1725
1726
1727
1728
1729
1729
1730
1731
1732
1733
1734
1735
1736
1737
1738
1739
1739
1740
1741
1742
1743
1744
1745
1746
1747
1748
1749
1749
1750
1751
1752
1753
1754
1755
1756
1757
1758
1759
1759
1760
1761
1762
1763
1764
1765
1766
1767
1768
1769
1769
1770
1771
1772
1773
1774
1775
1776
1777
1778
1779
1779
1780
1781
1782
1783
1784
1785
1786
1787
1788
1789
1789
1790
1791
1792
1793
1794
1795
1796
1797
1797
1798
1799
1799
1800
1801
1802
1803
1804
1805
1806
1807
1808
1809
1809
1810
1811
1812
1813
1814
1815
1816
1817
1818
1819
1819
1820
1821
1822
1823
1824
1825
1826
1827
1828
1829
1829
1830
1831
1832
1833
1834
1835
1836
1837
1838
1839
1839
1840
1841
1842
1843
1844
1845
1846
1847
1848
1849
1849
1850
1851
1852
1853
1854
1855
1856
1857
1858
1859
1859
1860
1861
1862
1863
1864
1865
1866
1867
1868
1869
1869
1870
1871
1872
1873
1874
1875
1876
1877
1878
1879
1879
1880
1881
1882
1883
1884
1885
1886
1887
1888
1889
1889
1890
1891
1892
1893
1894
1895
1896
1897
1897
1898
1899
1899
1900
1901
1902
1903
1904
1905
1906
1907
1908
1909
1909
1910
1911
1912
1913
1914
1915
1916
1917
1918
1919
1919
1920
1921
1922
1923
1924
1925
1926
1927
1928
1929
1929
1930
1931
1932
1933
1934
1935
1936
1937
1938
1939
1939
1940
1941
1942
1943
1944
1945
1946
1947
1948
1949
1949
1950
1951
1952
1953
1954
1955
1956
1957
1958
1959
1959
1960
1961
1962
1963
1964
1965
1966
1967
1968
1969
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
198

coupled to lid 14. First and second divider actuators 28 are connected to each other by a divider actuator connector 32 which allows the simultaneous operation of first and second divider actuators 28. As shown in Figs. 1 and 10, divider actuator 28 is pivotally coupled to lid 14 and also to divider actuator connector 32.

5 Divider actuator connector 32 comprises an angled linking member 82, a linking member 84, and a rod 86. Angled linking member 82 is pivotally coupled to latching member 80 at one end and pivotally coupled to linking member 84 at the other end. Linking member 84 is pivotally coupled to angled linking member 82 at one end and attached to rod 86 at the other end. Rod 86 links the first and second divider actuator 28 together such that a user can operate, simultaneously, the first and second divider coupler from either side of the vehicle.

10 As shown in Figs. 11 and 12, divider 16 and lid 14 pivot about the same axis of rotation. This is accomplished using a single hinge 34. In a preferred embodiment, a modified standard piano type hinge is used having segregated sections for separate attachment of lid 14 and divider 16. Hinge 34 has one side completely coupled to base structure 12, while the other side is alternately coupled to divider 16 and to lid 14 by independent sections 96, which are attached to divider 16, and sections 98, which are attached to lid 14. By doing this, lid 14 and divider 16 can pivot independent of one another or simultaneously.

Lid 14 also includes a lid plunger 100 of those well known in the art. Lid plunger 100 facilitates opening of lid 14 and supplies the necessary forces to keep lid 14 in an opened position unaided by the user.

5 Divider 16 includes a similar plunger, divider plunger 102, which is smaller in size than lid plunger 100 and that performs a similar function as lid plunger 100 except it acts upon divider 16. Divider plunger 102 is coupled to base support 12 and divider 16 and provides less relative force to divider 16 than does lid plunger 100 to lid 14. Divider plunger 102 will not support divider 16 in an opened position, but is of sufficient strength such that it allows divider 16 to slowly descend upon base support 12. Divider plunger 102 will prevent divider 16 from crashing down upon base support 12. By providing a plunger with insufficient strength to support divider 16 in an upright position, a user may open lid 14 from a closed position, thereby accessing top compartment 18, without lifting divider 16 as well.

10 As such, it will be obvious to those skilled in the art that the present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are
15 to be embraced within their scope.